REA response to DESNZ Green Industries Growth Accelerator: Hydrogen and Carbon capture, usage and storage supply chains.

The Association for Renewable Energy & Clean Technologies (REA) is pleased to submit this response. The REA represents industry stakeholders from across the sector and includes dedicated member forums focused on green gas & hydrogen, biomass heat, biomass power, renewable transport fuels, thermal storage and energy from waste (including advanced conversion technologies). Our members include generators, project developers, heat suppliers, investors, equipment producers and service providers. Members range in size from major multinationals to sole traders. There are over 500 corporate members of the REA, making it the largest renewable energy trade association in the UK.

The REA strongly supports the government's drive for both hydrogen and carbon capture. The strategy for both sectors is progressing positively with the awards of projects under both Track 1 and 2 clusters along with power CCUS, industrial carbon capture (ICC), waste and CCUS-enabled hydrogen projects. We have also seen the recent list of successful projects under the Hydrogen Allocation Round (HAR1) and completion of the application submission for HAR2. The progress has been within the timescales set by government and with expected dates for delivery of up to 2030. It is therefore appropriate that the government is also investigating measures which may limit the delivery of these projects and addressing supply chain issues is very worthwhile.

As a trade association we have members that span the renewable energy and clean technology sectors. The consultation responses were split over a number of specific questions with a request for evidence that was difficult to capture accurately or within the timeframes. We are aware industry parties will be responding directly and can provide the key information needed. We have therefore taken the decision not to respond to each specific question but to provide an overarching response. We also felt that were some key messages we needed to set out.

Supply chain issues.

From the experience of other members not specifically related to either hydrogen or Carbon Capture, the effect of COVID significantly stalled projects due to the difficulty obtaining particular parts. This was exacerbated by the effects of trading following BREXIT and the rise in inflation that was experienced globally. The knock- on impact is still being felt, particularly with the costs for materials, parts and key technology needed for projects - although there have been some improvements. However, its true to say that in the race to not only decarbonise but also compete with global demand for similar projects, lead times are significantly impacted. The requirement to reduce costs to not only compete in a bidding process but also to ensure value for money can lead to projects sourcing from a similar pool and not being locally produced. This has been the experience of some of our members particularly competing in the production of electrolysers.

Experience from some companies that have been market leaders for the hydrogen sector have already been forced to adapt through sourcing and producing more inhouse. This was the case for Logan Energy who have delivered to meet changing demand and developed bespoke solutions

where specific technology was either not available or not readily sourced. The advantage has been to provide a more integrated service as a standard offering.

On their website they stated - based on recent collaborative investment from Scottish Enterprise and green energy investment company, Lanxing New Energy:.

"*This investment allows Logan Energy to move forward with our mission to secure our position as an industry leader providing Integrated Hydrogen Energy Systems and Energy Transition Solutions across all market sectors. It will also allow us to address the supply chain issues the industry is facing by developing key relationships with OEMs and equipment developers around the globe and ramp-up our ground-breaking Research & Development (R&D) capabilities here in the UK using our unique know-how around hydrogen systems*". (News (All) | Logan Energy)

The suggestion that there needs to be some benefit to packaging of supply chain solutions would therefore seem accurate where there are clearly identified barriers to deployment. Its also important to point out that there are currently producers of technology and there are also those who manage the whole install. This may already run collaboratively but with so many projects that are now in the early stages of deployment there will inevitably be pinch points that will soon be evident.
Therefore, future supply chain issues rather than a focus on only currently known ones, need to be addressed.

We are unable to comment on specific supply chain issues. Also there have been numerous reports published by government identifying potential issues (e.g. Hydrogen supply chain evidence base (publishing.service.gov.uk)) and more recently and therefore more specific, the report by Wood PLC and Optimat Ltd July 2022 (Supply Chains to Support a Hydrogen Economy (publishing.service.gov.uk).

Some parts that are available may be under the specification for natural gas. Hydrogen is a different gas, being less dense and lighter and therefore to meet the requirements to ensure hydrogen doesn't leak, products will need to be made to a different `standard` and this is the same when ensuring the correct installation and maintenance. There can often be competition for products or raw materials which can be experienced across the sector. This could be as in the more widely recognised need for rare earth metals (Iridium and Platinum) in the construction of key technologies or may extend even to steel.

A rush for hydrogen products can create pressures in other sectors that will need to be considered as part of the wider picture and this could also be the case for carbon capture. Although there is recognition that the technology for carbon capture may be more readily available or even off the shelf (The Carbon Capture, Transport, and Storage Supply Chain Assessment: Advancing CCS Carries Low Supply Chain Risk | Department of Energy) there are many industries that will be looking at capturing CO2 from their processes and those that will be required to in future subsidies, certification, permitting or GHG removals and reporting.

In the case of biomethane production, the upgrading process currently removes biogenic CO2, which although in some cases is vented, is often required to be captured.
This can then be broken down into the need to compete with:

- capture technology needed for all industries;

- Carbon storage - particularly access to long term geological storage;
- transportation through either pipelines or road, including compressors.

The delays in accessing equipment can push back on the momentum. Some businesses looking at hydrogen as an additional option are currently facing a lead time to talk to technology providers so this could push decisions on future decarbonisation in other directions. Either to less appropriate solutions or to kick the decision down the road.

The other point which has been widely recognised is the need to ensure that hydrogen and carbon can be both transported and stored. This, as previously mentioned, is helped by the conception of clusters and the move towards more networked carbon and hydrogen transport. The introduction of models such as the HTBM and HSBM will further alleviate the concerns about joining the dots with the ramp up of hydrogen production projects from 125MW in HAR1 to 875MW in HAR2. Although it is useful to have hydrogen blending to derisk the investment in hydrogen production, its reasonably termed offtaker of last resort and the intention for both economic and logical reasons are that a direct use off taker would be the preferred option.

However, there are also concerns regarding access for industries, such as biomethane production, which will be required and choose to capture carbon for use and/or storage that may struggle to access effective routes.

The possibility of the provision of a local network to collect and transport carbon would be significant in alleviating the financial burden of being located so far away from a cluster or suitable storage location.

Planning and Permitting Barriers

There have been barriers to deployment that have been universally experienced across sectors which show a common trend. These are often linked to planning permissions with delays in planning application determinations through lack of experience, skills or staff and increasingly through public opposition to the development. Further issues have been experienced with permit applications through the Environment Agency for similar reasons as planning. This is important to include as this is a barrier to deployment and meeting delivery dates that have long been felt by more traditional technologies, but the difficulties for more nascent technologies such as Hydrogen and Carbon Capture will likely increase the issues. It is therefore welcomed that the government is trying to address the issues - publications such as Hydrogen Projects: planning barriers and solutions: research findings (publishing.service.gov.uk) where acted upon will help to alleviate these and will hopefully address similar issues experienced for renewable energy deployment as a whole.

Skills availability and training

REA strongly support the shift to renewable energy and clean technologies and are positive about the impact the green revolution can have for the economy particularly when it comes to opportunities for green skills and employment. The REA produce an annual report which presents the latest deployment and employment figures for the renewable energy and clean technology industry (REview23 - REA (r-e-a.net)). The report shows that while progress on

renewable power remains positive, until supportive Government policy measures are forthcoming for heat, transport and circular bioresources, it will continually be a challenge for the UK to meet its legally binding Net Zero commitments.
There has been progress and new training schemes have been established through either government support, through industry leads or both. Specifically for hydrogen there has been:

- Hydrogen training Academy by Northern Regional College
- Hydrasun Hydrogen Skills academy
- Hydrogen Skills Alliance (HSA)
- Hydrogen Skills partnership

In addition, REA were involved in the government's green jobs delivery group as part of a task and finish group.

All these initiatives are helping to establish the competent workforce that is needed to transition towards emerging green technologies. However, there should also be recognition that as mentioned for planning and permitting some of the constraints are through lack of staff/ experience in local authorities and regulators. This could also be through the civil engineering sector with so many projects competing to deploy at the same time. Therefore, consideration should be made across the supply chain for technology providers, installers, decision makers and enforcers.